DCP-1184

# TermiNet* 30

Electronic Services - Los Angeles
M14619X

## FUNCTIONAL SPECIFICATIONS

## TermiNet 30 Data Communication Printer

Trademark, General Electric Company U.S.A.
opyright, 1974 General Electric Company, U.S.A.

# FUNCTIONAL SPECIFICATION

# TERMINET* 30 PRINTER

*Trademark of the General Electric Company, USA

Copyright, 1975 General Electric Company, USA

TABLE OF CONTENTS


PAGE

1.0 SPECIFICATION SCOPE ..... 1

2.0 EQUIPMENT DESCRIPTION ..... 1

2.1 GENERAL DESCRIPTION ..... 1

2.2. CONFIGURATION MODELS ..... 1

3.0 SPECIFICATIONS ..... 1

3.1 CODE COMPLIANCE ..... 1

3.2 PERFORMANCE ..... 1

3.3 COMMUNICATION INTERFACES ..... 2

3.4 PRINTING CHARACTERISTICS ..... 2

3.5 PRINTER CHARACTERISTICS ..... 3

3.6 PAPER HANDLING ..... 3

4.0 CONTROLS, INDICATORS, ADJUSTMENTS ..... 4

4.1 CONTROL CLUSTER—KSR MODEL ..... 4

4.2 CONTROL CLUSTER—SR MODEL ..... 5

4.3 ADDITIONAL PRINTER CONTROLS ..... 5

5.0 KEYBOARD ..... 5

6.0 CONTROL CODES ..... 6

6.1 LINE CONTROL CODES ..... 6

7.0 TIMING CHARACTERISTICS ..... 7

7.9 TIME DELAY INTERVAL AND FILL CHARACTER TABLE ..... 9

8.0 OPTIONAL CIRCUIT MODULES ..... 10

8.1 AUTOMATIC ANSWERBACK ..... 10

8.2 DATASET CONTROL ..... 10

8.3 CURRENT INTERFACE ..... 10

8.4 LINE CONTROL ..... 11

8.5 INTEGRAL 300 BAUD MODEM ..... 11

8.6 INTEGRAL 1200 BAUD MODEM ..... 11

PAGE


8.7 VERTICAL FORMAT UNIT ..... 12

9.0 STRAPPING OPTIONS ..... 12

9.1 STOP BITS ..... 12

9.2 FULL DUPLEX ..... 12

9.3 AUTOMATIC MOTOR CONTROL ..... 12

9.4 INTERRUPT TRANSMISSION ..... 12

9.5 PAPER-OUT BREAK ..... 12

9.6 PARITY GENERATION AND DETECTION ..... 12

9.7 DELAY AFTER CARRIAGE RETURN ..... 12

10.0 MISCELLANEOUS OPTIONS ..... 13

10.1 NUMERIC CLUSTER ..... 13

10.2 COPY HOLDER ..... 13

10.3 TELEPHONE SHELF ..... 13

10.4 FORMS ACCUMULATION SHELF ..... 13

10.5 MOBILE CART ..... 13

10.6 EXPANDED LINE LENGTH ..... 13

10.7 MULTIPLE VOLTAGES, ECMA KEYBOARD ..... 13

11.0 INTERFACE DEFINITIONS ..... 13

12.0 ELECTRICAL SPECIFICATIONS ..... 15

13.0 MECHANICAL SPECIFICATIONS ..... 15

14.0 ENVIRONMENTAL SPECIFICATIONS ..... 16

15.0 ORDERING INFORMATION ..... 16


ILLUSTRATIONS


FIGURE 1 PRINT CHARACTER SET ..... 17

FIGURE 2 CONTROL CLUSTER ..... 18

FIGURE 3 ANSI AND ECMA KEYBOARDS ..... 19

FIGURE 4 TERMINET 30 OUTLINE DRAWING ..... 20

## 1.0 SPECIFICATION SCOPE

This Specification describes the operation, performance, and physical characteristics of the General Electric TermiNet 30 Data Communication Printer, and its various options.

## 2.0 EQUIPMENT DESCRIPTION

### 2.1 GENERAL DESCRIPTION

The TermiNet 30 Printer provides terminal facilities for the exchange of communication in attended or unattended mode via appropriate transmission facilities. The TermiNet 30 is capable of transmitting and receiving data at various rates up to 1200 baud, when equipped with tape options, in serial asyncronous form. It is an impact printer that prints up to 30 characters per second on conventional fan fold, sprocket feed paper. The Printer is primarily electronic in design and contains a minimum number of moving parts. The TermiNet 30 is modularized in construction, both mechanically and electrically. Its electronics, including power supplies and optional circuit boards are contained inside a functional pedestal on which the Printer is mounted. Application flexibility is provided with easily added options most of which are field installable.

### 2.2 CONFIGURATION MODELS

The TermiNet 30 is manufactured in two basic models.

a) **Keyboard Send-Receive (KSR)**—A model capable of printing received data and locally transmitted data from an attached keyboard.

b) **Send-Receive Only (SR)**—A model capable of printing received data, but does not have a Keyboard. Data may be transmitted from the Automatic Answerback and Magnetic Tape options only.

c) **Magnetic Send-Receive (MSR-1)**—KSR with a single magnetic tape cassette accessory mounted in a bridge over the printer.

d) **Magnetic Send-Receive (MSR-2)**—This version contains two magnetic tape cassette units in the bridge.

Note: MSR models will be described in a separate functional specification.

## 3.0 SPECIFICATIONS

### 3.1 CODE COMPLIANCE

Underwriters' Laboratory Standard 478
Canadian Standard Association (Pending)
Federal Communications Commission, Rule 15
Electronic Industries Association Standard RS-232C
American National Standard Institute X3.4-1968 (Code Set)
American National Standard Institute X4.14-1971 (Keyboard)
European Computer Manufacturer's Association, Standard ECMA-23, June 1969
International Electrotechnical Commission Publication 435 (Pending)

### 3.2 PERFORMANCE

a) **Type of Transmission**—Serial Asynchronous

b) **Transmission Code**—The Printer is capable of generating all 128 codes of the ASCII code set as defined in ANSI X3.4-1968.

c) **Transmisson Speed**—110, 200, 300, and 1200 Baud. Printing is inhibited at 1200 baud.

d) **Transmission Mode**—Two-way non-simultaneous, transmitted data is printed locally (Half-duplex). Optionally local data can be inhibited from printing (Full-duplex).

e) **Code Level**—Eight, seven intelligence bits plus parity.

f) **Unit Code**—10 char/sec.—11 bits (1 start, 7 intelligence, 1 parity, and 2 stop bits). 20, 30, and 120 char./sec.—10 bits (same as above except 1 stop bit). See section 9.1.

## 3.3 COMMUNICATION INTERFACES

The Printer without interface options provides only EIA transmitted data, received data and signal ground, for use with Acoustic Couplers or modems that do not require control signals (such as G.E. TDM114, TDM115, and Originate Only 300 Baud Integral Modem). Alternate Interfaces are discussed in Section 8.

With the Dataset Control option the interface between the Printer and the data source conforms to EIA Standard RS-232C, except SCA is on pin 11 instead of pin 19 for Bell type Dataset compatibility.

Control signals are optionally available with the Dataset Control option which will also provide Automatic Motor Control, Status, automatic transmission of the Answerback Message and READY indicator operation. See section 8.2.

a) **Dataset Cables**—A dataset cable (5 feet long), terminated at each end with a twenty-five (25) pin male connector, is provided with the Printer.

If an optional Integral Modem or Current Interface is ordered, an appropriate cable is substituted.

b) **Signal List**—The following circuits are used with various dataset support options.

| Pin Number | Circuit | Description |
|---|---|---|
| 1 | AA | Protective Ground |
| 2 | BA | Transmitted Data |
| 3 | BB | Received Data |
| 4 | CA | Request to Send |
| 5 | CB | Clear to Send |
| 6 | CC | Data Set Ready |
| 7 | AB | Signal Ground |
| 8 | CF | Received Line Signal Detector |
| 11 | SCA | Secondary Transmitted Data |
| 12 | SCF | Secondary Received Line Signal Detector |
| 20 | CD | Data Terminal Ready |
| 22 | CE | Ring Indicator |

All other pins are reserved for special applications.

## 3.4 PRINTING CHARACTERISTICS

a) **Printing Speed**—Maximum of 30 characters per second.

b) **Print Character Set**—The print character set is comprised of the 63 characters in columns 2 through 5 of the ASCII Code Chart. The Back arrow " ← " and Up arrow " ↑ ", replace the Underline " _ " and Circumflex " ^ " respectively. With the Lower Case Printing option installed, the complete set of 94 printable characters in the ASCII set may be printed. See figure 1.

c) **Horizontal Character Spacing**—The horizontal character spacing is 10 characters per inch. With the Expanded Line Length option the horizontal spacing is 16.5 characters per inch.

d) **Vertical Line Spacing**—The vertical line spacing is 6 lines per inch.

e) **Print Line Length**—The Printer has 80 print positions. With the Expanded Line Length option, 132 print positions are available.

f) **Margin Width**

| Print Positions | Paper Width | Left Margin | Right Margin |
|---|---|---|---|
| 80 or 132 | 9.5" | 0.573" | 0.927" |

Left margin is measured from edge of paper to centerline of first character. The right margin is from the last character to edge of paper. The Margin Limit Lever may be used to increase the right margin with a corresponding decrease in print positions.

## 3.5 PRINTER CHARACTERISTICS

Characters are formed by print wires striking an inked ribbon in a 5 x 7 matrix array. The Printer is designed to permit striking between horizontal element positions for improved character formation.

a) **Ribbon**—A ribbon cartridge that contains a continuous ribbon loop is provided for easy and clean replacement by the operator.

b) **Print Position Indicator**—A graduated scale is provided adjacent to the print line for operator reference. This will indicate in which column on the paper printing has occurred.

c) **End-Of-Line Alarm**—An end-of-line warning bell sounds six print positions before the end of the print line. The warning bell is activated only by data entered from the keyboard.

d) **Excess Data**—Data (except when from the keyboard) that exceeds the right margin causes the printing of a 5 x 5 block in the column following the right margin.

e) **Print Visibility**—Print visibility allows all previous lines and all of the current line up to and including at least half of the last character printed to be easily read.

## 3.6 PAPER HANDLING

The Printer is designed for use with continuous fan-fold pin-feed paper supplied from an external supply.

a) **Sprocket Design**—Pin design and hole spacing is in accordance with industry standards, with sprocket holes spaced horizontally 0.25" from paper edge and spaced vertically 0.50". Nominal hole diameter is 5/32".

b) **Number of Copies**—The Printer is capable of handling up to a four part form set with a maximum form set thickness of 0.025".
Recommended paper weights are:

| | |
|---|---|
| 1 part | 15 lb. paper |
| 2, 3, or 4 part | 13.5 lb. paper, 8 lb. carbon |

c) **Paper Path**—Paper enters horizontally at the rear of the Printer enclosure two inches above the pedestal. The paper then moves between the print head and print frame to the paper pin feed wheels. It then exits over the paper handling rack at the rear of the Printer.

d) **Low Paper Alarm**—A sensor is provided to detect that the forms supply is depleted. Upon detection of a PAPER OUT condition the Printer will stop printing, light the PAPER OUT indicator located on the keyboard and if so strapped, transmit a "Break" signal and light the Interrupt indicator. See section 9.5.

e) **Paper Advance Knob**—A knob is provided on the right side of the Printer which when depressed, allows rotating the paper pin feed wheels to advance paper in a forward direction.

f) **Paper Width Adjustment Lever**—An adjustable right pin feed wheel is provided to accommodate paper width of 4 to 9.5" inclusive. The left wheel is fixed in position.

g) **Paper Release Lever**—This lever, located on the left side of the top cover opening, allows the rear portion of the print frame to swing back. This action facilitates paper loading, changing the ribbon cartridge and use of the Part Form Lever.

h) **Part Form Lever**—This two-position lever is located on the left side of the print frame. One position is for one or two part form paper and the second position is for three or four part form paper. This adjustment is to be made only when the print frame has been released.

i) **Margin Limit Lever**—This controls the right margin and end-of-line warning bell. The lever is indexed to the proper position by moving it forward then sliding it sideways until its index mark is on the desired column, then releasing it. The warning bell will sound six positions before end-of-line.

## 4.0 CONTROLS, INDICATORS, ADJUSTMENTS

### 4.1 CONTROL CLUSTER—KSR MODEL

There is an operator's control cluster mounted on the left side of the keyboard. The Control Cluster includes the following pushbuttons and LED indicators. See figure 2A.

a) **Motor**—This pushbutton is used to turn the motor on and off. An adjacent indicator is energized when the motor is on.

b) **Local**—When this pushbutton is depressed, only local data from the keyboard, Answerback or Magnetic Tape Accessory may be printed. Transmission or receipt of data is inhibited. If the Dataset Control option is installed, interface circuit CD (Data Terminal Ready) is held in an OFF condition so that the Printer may not be called remotely.

c) **Here Is**—This pushbutton has no effect unless the Answerback option is included. When the option is installed and the pushbutton is depressed, the "Answerback" message is printed and transmitted. See section 8.1.

d) **Transparency**—This pushbutton is used in conjunction with the optional magnetic tape equipment to enable reading and/or recording of other than ASCII coded data. When it is in the ON position, the Printer's logic is "transparent" to all codes so that no action occurs other than processing by the tape equipment. In this mode of operation there is no printing or control code action, and no parity bit insertion.

e) **Interrupt**—This is a pushbutton which, when depressed, transmits a timed 250 or 450 millisecond spacing or "break" signal. See section 9.4. While the adjacent indicator is capable of being lit, this action does not cause it to light. When an "INTERRUPT" is received over the incoming data line, the indicator is lighted and the keyboard is inhibited. The minimuum duration of a received "INTERRUPT" or "break" signal must be 160 milliseconds to insure detection by the Printer. Pressing the pushbutton after receipt of an interrupt turns off the indicator and restores the keyboard to operation. Under this condition a "break" signal is not transmitted.

f) **All Caps**—When this two position pushbutton is in the ON (down) position, character generation from the keyboard is limited to those characters from columns 0 through 5 and Delete character of the ASCII code chart. See figure 1. The position of this pushbutton has no effect on received data. If the Lower Case Printing option is not installed, all received characters from columns 6 and 7 (except delete) will be mapped to their upper case character in columns 4 and 5 respectively.

g) **Auto LF**—This two position pushbutton when in the ON (down) position, automatically generates a carriage return line feed code sequence when the keyboard RETURN key is depressed. In the OFF position no automatic LF action occurs. The position of this pushbutton has no effect on received data.

h) **Power On**—When AC power is provided to the Printer and the internal power supply circuits are operating correctly the Power On indicator is illuminated.

i) **Ready**—This indicator illuminates when a selected EIA RS-232C signal comes ON, if the Dataset Control option is installed. The individual signal that controls the indicator is selected by a strapping option. These signals are CB, CC, CF or SCF; also a Marking Data condition if the Current Interface option is used.

The indicator is extinguished during receipt of a "break". It is also controlled by line turnaround control characters if the Line Control option is installed, to indicate to the operator that the terminal is ready or not ready to transmit. The Dataset Control option may be strapped so that receipt of the Reverse Channel tone is required to enable the READY light.

j) **Paper Out**—This indicator illuminates upon detection of a low paper condition which causes the Printer to stop printing. This action occurs when approximately 1.5 inches of paper remain. This also occurs, when the Paper Release Lever has released the print frame (See section 3.6g), or the Printer's top cover or paper shield is raised.

## 4.2 CONTROL CLUSTER—SR MODEL

The Control Cluster is on the left side of a vertical panel located on the front of the Printer. The Control Cluster includes the following pushbuttons and LED indicators. See figure 2B.

a) **Motor**—Same as Section 4.1a.

b) **FF (Form Feed)**—When the Vertical Format Unit option is installed, depressing the Form Feed pushbutton advances the paper in the Printer to the desired starting point on the next form. See section 8.7.

c) **LF (Line Feed)**—Depressing this pushbutton causes the paper to advance one line at a time.

d) **Power On**—Same as Section 4.1h.

e) **Ready**—Same as Section 4.1i.

f) **Paper Out**—Same as Section 4.1j.

## 4.3 ADDITIONAL PRINTER CONTROLS

a) **Power Switch**—A rocker switch located on the pedestal front panel controls primary AC power to the Printer. See section 9.3.

b) **Rate Switch**—A four position switch, located under the top cover, is used to select the data rate of the Printer. The speeds are 10, 20, 30, or 120 characters per second, the 120 character per second rate forces the Printer motor off, inhibiting printing.

## 5.0 KEYBOARD

The KSR Printer is provided with a standard four-row ANSI-X4.14-1971 keyboard. (See figure 3A) capable of generating all 128 ASCII characters.

A feature of the keyboard is n-key rollover, which permits character generation even if another key button is already depressed. The key buttons are easily removable and individually replaceable. The character markings are molded in place rather than imprinted and thus will not wear off with use. The actions of the special keys are described below.

a) **ESC**—This key produces the ESCAPE code and is normally depressed preceeding another key. The next character generated following ESC is inhibited from printing. This key and those used with it, namely, HT SET, HT CLR, and RDR REV, are uniquely color-coded for easy recognition.

b) **CTL**—This key is depressed and held down while another key is used. Rather than generating a code of its own, it modifies the code pattern produced by the other key. The following ASCII control characters are marked on the appropriate keytop: ENQ, DLE, NUL, FS, GS, RS, US, BEL, SUB, CAN, ETX, STX. Additional markings are provided for RDR ON (DC1), PCH ON (DC2), RDR OFF (DC3), and PCH OFF (DC4).

c) **RPT**—This key is also depressed along with a second key to repeat the character or function produced by the other keys. The repeat rate is approximately 10 characters per second.

d) **RETURN (CR)**—Depressing the key returns the printing to the beginning of the print line. When the AUTO LF switch is in the ON (down) position, this key will produce a LINE FEED as well as a CARRIAGE RETURN code.

e) **LF (Line Feed)**—Depressing this key advances the paper in the Printer one line.

f) **VT (Vertical Tab)**—When the Vertical Format Unit option is installed, depressing the VT key advances the paper in the Printer to the vertical position where the next printing is to occur. (See section 8.7).

g) **FF** (Form Feed)—When the Vertical Format Unit option is installed, depressing the FF key advances the paper in the Printer to the desired starting point on the next form. (See section 8.7).

h) **EOT** (End of Transmission)—This key transmits the EOT code character. (See section 6.1d).

i) **DEL** (Delete)—When depressed this key generates the delete code character.

j) **BS** (Backspace)—When depressed this key generates the Backspace character, but does not cause the Printer to backspace.

k) **Shift and Shift Lok**—With the shift key held depressed, upper case characters are developed as the various keys are depressed. The shift lock key maintains a shift mode, until it is depressed a second time.

## 6.0 CONTROL CODES

The TermiNet 30 keyboard is capable of generating all ASCII control codes. Listed below are those specific codes which cause terminal action. Those not listed cause no action. In the description of the code action, the term "receipt" or "when received" refers to signals received over the data line from a remote point and not generated locally. The term "recognition" or "when recognized" refers to signals received from a remote point as well as to those generated locally.

a) **BEL** (Bell or Alarm)—When recognized, this code rings a bell.

b) **CR** (Carriage Return)—Recognition of CR returns the printing to the first print position.

c) **ENQ** (Enquiry)—When the Answerback option is installed and the Clear to Send lead (circuit CB) is ON, receipt of this code causes the "Answerback" message to be triggered. Additionally, if the Line Control option is installed, the status of the Printer is indicated by the transmission of ACK or NAK following the "Answerback" message and turns the line around. The line control responses may be used without the Answerback option.

d) **FF** (Form Feed)—When the Vertical Formal Unit is installed, recognition of FF advances the paper in the Printer to the desired starting point on the next form. (See section 8.7).

e) **LF** (Line Feed)—Recognition of this code advances the paper in the Printer one line.

f) **VT** (Vertical Tab)—When the Vertical Format Unit is installed, recognition of VT advances the paper in the Printer to the vertical position where the next printing is to occur. (See section 8.7).

## 6.1 LINE CONTROL CODES

The following line control codes are primarily used when the Line Control and Dataset Control options are installed in MSR model Printers.

a) **ACK** (Acknowledgment)—The code is acted upon only when the Line Control option is installed. Recognition of ACK turns the line around. A Printer transmits ACK as a response to ENQ if the Printer is not out of paper, is not in a LOCAL mode and the Printer's motor is turned on.

b) **DC1, DC2, DC3, DC4** (Device Control 1, 2, 3, 4)—These codes are used for control of the Magnetic Tape options on MSR models. (Read mode, Write mode, Stop Read, Stop Write).

c) **DLE** (Data Link Escape)—When the Line Control option is installed, DLE is used in combination with the following code:

1) **DLE EOT**—When recognized, these codes initiate the automatic disconnect sequence by turning the Data Terminal Ready signal (circuit CD) to the Data Set off. The Printer motor will turn off. The Dataset Control and Line Control options are required.

d) **EOT** (End-of-Transmission)—When the Dataset Control option is installed, recognition of EOT may be used to turn off the Printer motor and initiate a dataset disconnect. If the Line Control option is installed recognition of EOT may be used to either turn the transmission line around or always turn the Printer to receive. When EOT is used as a turn character, the Dataset Control option should be strapped to ignore this code.

e) **ETX** (End-of-Text)—This control code is effective only when the Line Control option is installed. When the Printer is in a transmit mode, local generation of ETX places it in a receive mode. When received, it places the Printer in a transmit mode.

f) **NAK** (Negative Acknowlegment—This code is acted upon only when the Line Control option is installed. Receipt of a NAK turns the line around. A Printer transmits NAK on receipt of ENQ if it has an out of paper condition or the Printer's motor is off.

g) **STX** (Start of Text)—When the Line Control option is installed, local generation of this code turns the Printer to transmit.

## 7.0 TIMING CHARACTERISTICS

The following paragraphs define the rules which must be followed when formatting data for printing on a TermiNet 30 Printer. This format allows accurate reproduction of the data presented to the Printer with the maximum efficiency possible.

In normal printing the only control codes that require a finite time delay are Carriage Return, Vertical Tabulation and Form Feed. **Linefeed does not require any time delay interval.** Some timing consideration is required when using the Automatic Motor Control feature of the Dataset Control option or Current Interface options.

Fill characters may be transmitted for the required delay interval; however, it should be noted that delay times do not necessarily equal the sum of the fill character time. Fill characters may be any code character that does not affect Printer operation, i.e., certain control codes and Delete.

**SYMBOLS USED IN THE FOLLOWING EXAMPLES**

C - Carriage Return

F - Form Feed

L - Line Feed

V - Vertical Tabulation

# - Fill Character

NOTE: **All** Examples are at 300 Baud.

## 7.1 NORMAL SINGLE CARRIAGE RETURN AND LINEFEED SEQUENCE

**Example One:**

Line 1: The TermiNet 30 Data CommunicationsCL######

Line 2: Printer Operates at 30 CharactersCL######

Line 3: Per Second.CL

## 7.2 LINEFEED AND CARRIAGE RETURN SEQUENCE

**Example Two:**

Line 1: When The Normal Carriage Return and Linefeed LC#######

Line 2: Code Sequence Is ReversedLC#######

Line 3: One Additional Fill Character Is RequiredLC

## 7.3 CONSECUTIVE LINEFEEDS

**Example Three:**

Line 1: To Produce One Printing Line FollowedCL####LL

Line 2:

Line 3:

Line 4: By Two Blank Lines Use Fills After The First CL######

Line 5: Carriage Return And Linefeed Sequence OnlyCL

## 7.4 VERTICAL TABULATION OR FORM FEED

**Example Four:** Five Lines

Line 1: To Vertical Tabulate or Form Feed Five LinesCV######

Line 2:

Line 3:

**Line 4:**

Line 5:

(Since the Carriage Return codes needs seven fills the Vertical Tab code can be used as a fill. The vertical tabulation can occur and be completed during this same delay interval. 5 ÷ 1.66 = 3.)

Line 6: Only Three Fills Are RequiredCL

## 7.5 VERTICAL TABULATION AND FORM FEED

**Example Five:** Twenty Lines

Line 1: To Vertical Tab or Form Feed TwentyCV###########

(Since the VT needs 12 fills the carriage return will be completed before the vertical tab is completed. 20 ÷ 1.66 = 12)

Line 21: Lines, Twelve Fills Are RequiredCL

## 7.6 CARRIAGE RETURN AND LINEFEED WITH VERTICAL TABULATION OR FORM FEED

**Example Six:**

Line 1: Combine Example One and Example Four CLV#####

Line 2:

Line 3:

Line 4:

Line 5:

Line 6:

(The carriage return requires seven fills, the LF and VT codes can be used as two fills. The vertical tabulation requires three fills and can be completed during the same delay interval. 5 ÷ 1.66 = 3)

Line 7: Again Only Three Fills Are Required For The TabulationCL

## 7.7 MOTOR OFF WITH DATASET CONTROL OPTION

**Example Seven:**

Line 1: To Allow The Last Character To Be PrintedCL######

Line 2: Before Motor Off Insert Three Fills After That Character###

(Assume Motor Off After "###")

## 7.8 MOTOR ON WITH CURRENT INTERFACE OPTION

**Example Eight:**

Line 1: #########Insert Nine Fill CharactersCL######

Line 2: Between Current beginning and First CharacterCL

## 7.9 TIME DELAY INTERVAL AND FILL CHARACTER TABLE

### TERMINET 30 PRINTER

| FUNCTION | DELAY INTERVAL (MSEC) | | | ALTERNATE NUMBER OF FILL CHARACTERS | | | PLACEMENT OF DELAY OR FILL CHARACTERS |
|---|---|---|---|---|---|---|---|
| | 10 cps | 20 cps | 30 cps | 10 cps | 20 cps | 30 cps | |
| Normal Single CR and LF Code Sequence | 73 | 213 | 260 | 1 | 3 | 6 | After LF Code Before Next Char. |
| Carriage Return | 176 | 316 | 363 | 2 | 4 | 7 | After CR Code |
| Vertical Tabulation or Form Feed | 20 x No. of lines | 56 + 20x No. of lines | 106 + 20x No. of lines | No. of lines÷ 5.0 | No. of lines÷ 2.5 | No. of lines÷ 1.66 | After VT or FF Code Before Next Character |
| Automatic Motor ON to First Char. with Dataset Control Option | 0 | 0 | 0 | 0 | 0 | 0 | —— |
| Last Char. to Motor OFF with Dataset Control Option | 244 | 244 | 244 | 3 | 3 | 3 | Between Last Char. and Motor OFF |
| Beginning of Line Current To First Char. with Current Interface Option | 300 | 300 | 300 | 3 | 6 | 9 | Between Beginning of Current and Transmission of First Character |
| Last Character to End of Line Current with Current Interface option | 0 | 0 | 0 | 0 | 0 | 0 | —— |

Note: Because of internal buffering logic, delay intervals do not necessarily equal fill character time.

## 8.0 OPTIONAL CIRCUIT MODULES

The following optional circuit modules are available and are plugged into the logic rack located within the Printer's pedestal. Reference should be made to separate specification sheets for more detailed data on each of the options.

## 8.1 AUTOMATIC ANSWERBACK

This optional board has the ability to transmit an "Answerback" message of up to twenty (20) characters in response to a received ENQ code. The board is coded through use of diodes which are assembled in a matrix pattern on the board. The diodes are inserted into friction-type terminals and thus the message code may be readily changed in the field without use of special tools.

When a Printer with this option board installed is "called", on the switched network activating signal CE, the Printer will automatically transmit and print (if the motor is on) its "Answerback" message. This transmission is delayed 200 milliseconds after the CB circuit (Clear to Send) is turned ON by the dataset to allow the Printer motor to come up to speed. (Requires the Dataset Control option). A strapping option will disable the automatic answerback if desired and will allow it merely to respond to ENQ.

Automatic Answerback will optionally enable the transmission of ACK or NAK at the end of the "Answerback" message and turn the line to receive if the Line Control and Dataset options are installed. For use only on switched networks with data sets that are wired for automatic answering.

## 8.2 DATASET CONTROL

This optional board permits the use of Bell type 103 and 202 External Datasets and optional Integral 300 and 1200 Baud Modems. (See sections 8.5 and 8.6). When using integral modems the Dataset Control option allows use of Bell type CBS, CBT or CDT Data Access Arrangements.

Certain signals provide Automatic Motor ON/OFF and READY light control. A False Call Detector Timer places the Printer in a Standby state if the answering dataset does not go to a Data Mode within 12 seconds after answering a call.

The Dataset Control option also delays Answerback transmission on initial access until the Printer is ready to print. This option also provides a Status signal of the Printer's motor.

Without this option, the Printer only has EIA signals, BA, BB, and AB. See section 3.3.

## 8.3 CURRENT INTERFACE

This circuit card is used instead of the Dataset Control option and allows the terminal to function in a twenty or sixty milliamp current loop system. It is primarily for use where ground isolation is needed between the terminal and the opposite end of the data link. This option offers noise protection of low impedance circuitry and is used typically on hardwired, in-plant point-to-point systems. There are two groups of this circuit board available:

A. Power source from other than Printer.

B. Internal power source for each data loop.

A strapping option will allow a low voltage condition, or the Printer in a LOCAL mode to provide a status signal to the data source by opening the transmit current loop.

An Automatic Motor Control feature is provided by a strapping option that monitors the receive current loop, when a signal is detected the Printer will turn on. The Printer will turn off approximately 3 seconds after current is removed from the line.

Cannot be used with the Dataset Control option, Integral Modems, Acoustic Coupler or Datasets that do not have specific provisions for current loop.

A five foot cable replaces the standard dataset cable with this option. When ordering this option, specify either External or Internal power source type of circuit board.

## 8.4 LINE CONTROL

This option allows control of a two-way alternate or half duplex communication line, by changing the status of the dataset from a transmit to a receive mode. Refer to section 6.1 for a description of code actions which occur.

Non-coded Line Control is available as a strapping option, this mode the transmit/receive state of the Printer is determined by the dataset signals CF and SCF in place of control codes.

On full duplex applications, the Line Control option may provide verification messages in two-way alternate operation by using the ENQ code to check the motor status of the receiving Printer. Automatic disconnect control of the dataset is also provided by the recognition of DLE EOT code sequence.

Note: For use only on MSR models.

## 8.5 INTEGRAL 300 BAUD MODEM

This optional board is an Originate Only Data Set, and is end to end compatible with Bell Type 103 Datasets. It allows direct connection between the printer and a data line using a type CDT MDAA (Manual Data Access Arrangement). It is suited for two-way simultaneous data flow (full duplex), at rates to 300 baud, using frequency shift key modulation techniques.

Operating frequencies are as shown below:

| | | |
|---|---|---|
| Transmit: | Mark | 1270 Hz. |
| | Space | 1070 Hz. |
| Receive: | Mark | 2225 Hz. |
| | Space | 2025 Hz. |

Straps are provided on the board to allow setting initial transmit level.

## 8.6 INTEGRAL 1200 BAUD MODEMS

There are three available 1200 baud modem boards. These are:

A. Half-duplex, two wire, Automatic Data Access Arrangement (ADAA) Bell Type CBS or CBT. The Printer will supply power for the CBT arrangement.

B. Half-duplex, two wire, Manual Data Access Arrangement (MDAA) Bell Type CDT.

C. Full-duplex, four wire, Dedicated or private line.

These optional circuit boards serve the same function as half-duplex and full-duplex Bell type 202 Datasets to transmit and receive data on MSR models at 1200 baud. No printing is possible at the 1200 baud rate.

Additionally, there is a separately available Reverse Channel Modem option which is **highly recommended** for use with the integral half-duplex modems. This provides a supervisory channel which is useful for monitoring the status of the receiving Printer or as a means to send a "break" to stop transmission. Line Control is normally required for half-duplex modems.

Note: When the Printer is supplied with an Integral Modem, a special 20 foot long cable is included for connection of the Printer to the appropriate Data Access Arrangement.

## 8.7 VERTICAL FORMAT UNIT

This option includes the addition of an electro-mechanical assembly to the Printer frame as well as a circuit board which plugs into the logic rack inside the pedestal. By programming (punching) a length of standard one-inch wide, eight channel paper or mylar tape, forms up to 14 inches in length may be formatted for use in the Printer. Vertical Tabs may be at any line increment and Form Feeds may be used to feed a new form into position. The Vertical Format Unit may be controlled either locally or remotely only when the programmed tape is installed.

## 9.0 STRAPPING OPTIONS

Application flexibility is further provided through the interchange of straps (jumpers) on a circuit board in the logic rack located in the Printer's pedestal. These strapping options are summarized below. Excluded are those that are available on optional circuit boards.

## 9.1 STOP BITS

Jumpers are provided to generate two stop bits at 20, 30, and 120 characters per second instead of only one stop bit. Two stop bits are always generated at 10 characters per second.

## 9.2 FULL DUPLEX

The addition of this jumper will enable simultaneous transmission and reception of data. Transmitted data from the Printer is inhibited from printing. Depressing the LOCAL pushbutton overrides the Full Duplex mode of operation, enabling the printing of local data.

## 9.3 AUTOMATIC MOTOR CONTROL

The addition of a strap will cause the motor to turn on when AC power is applied. Printers with the Dataset Control option may be strapped so that the motor turns on when one of the EIA RS-232C signals CB, CC, CF (or Marking Data in the current interface option) come ON. The motor will turn off when the signals go OFF.

## 9.4 INTERRUPT TRANSMISSION

Jumpers may be selected that will generate a timed INTERRUPT or "Break" signal for 250 msec, 450 msec, or for as long as the INTERRUPT pushbutton is depressed. The interrupt signal is a continuous space on the Transmitted Data lead, circuit BA, for the selected time period.

## 9.5 PAPER-OUT BREAK

A paper-out condition, print frame released, raised top cover or paper shield will illuminate the Paper Out indicator and turn off the motor. If a jumper is added the INTERRUPT indicator will illuminate and a "Break" signal will be transmitted if a fixed INTERRUPT time interval has been selected (See section 9.4) and if the Printer is not in a LOCAL mode. Removing the jumper will prevent both the transmission of the "Break" signal and illumination of the INTERRUPT indicator.

## 9.6 PARITY GENERATION AND DETECTION

Strapping options allow a variety of parity options. The parity bit may be a mark, space, odd or even.

When strapped for parity error detection, a parity error will cause a 5 x 5 error symbol to be printed.

## 9.7 DELAY AFTER CARRIAGE RETURN

When transmitting in a Full Duplex mode to another TermiNet 30 Printer, data transmission is delayed 256 milliseconds after transmitting a Carriage Return code to allow the receiving Printer to complete its return action without loss of data. Removal of this jumper will inhibit the delay from occurring.

## 10.0 MISCELLANEOUS OPTIONS

Several additional options other than those accomplished with added circuit boards or through interchange of internal jumpers are also available. These are listed below.

### 10.1 NUMERIC CLUSTER

A Numeric Cluster option, located on the right side of the keyboard, simplifies the entry of numerical data with an eleven button keyboard. The key buttons include the numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and a decimal point (.). The Numeric Cluster is factory installable only.

### 10.2 COPY HOLDER

The Copy Holder accessory assists the Printer operator by holding copy material in easy viewing range at a convenient adjustable angle. The Copy Holder is available in kit form for field installation only and requires the optional Telephone Shelf to which it is mounted.

### 10.3 TELEPHONE SHELF

A telephone (Dataset) Shelf may be mounted on the right side of the pedestal and is required when ordering the Copy Holder. The shelf area is approximately 10 x 20 inches (25 x 51 cm). The Telephone Shelf is field installable only.

### 10.4 FORMS ACCUMULATION SHELF

The Forms Accumulation Shelf can easily be attached to the rear of the pedestal to efficiently handle and stack completed forms. Its surface area is approximately 12 x 19 inches (30 x 48 cm). Field installable only.

### 10.5 MOBILE CART

The Mobile Cart provides a convenient method to move a TermiNet 30 Printer. A locking device securely attaches the cart to the pedestal.

### 10.6 EXPANDED LINE LENGTH

Mechanical changes to the Printer change the horizontal character spacing from 10 to 16.5 characters per inch, allowing 132 characters per line.The advantages are convenience of 9.5 inch wide paper with lower paper costs and no computer software changes.

The End-of-Line Alarm and Margin Limit Lever are eliminated and the Print Position Indicator is graduated for 132 print positions. The Expanded Line Length option is factory installable only.

10.7 **MULTIPLE VOLTAGES, ECMA KEYBOARD**—As an alternative to the 117 Volt nominal voltage, this option allows nominal voltage inputs of 100/117/200/220/240 ± 10% Single Phase. In addition these units will be equipped with an ECMA Keyboard layout. See figure 3B.

## 11.0 INTERFACE DEFINITIONS

A description follows of the signals provided on the interface connector when the Dataset Control option is supplied. If Transmitted Data (BA), Received Data (BB), and Signal Ground (AB) are the only signals required then the Dataset Control option is not necessary.

### 11.1 PROTECTIVE GROUND (AA)

This lead is tied to machine frame and enclosure.

### 11.2 SIGNAL GROUND (AB)

This lead establishes the common ground reference potential for all interchange circuits (except Protective Ground).

### 11.3 TRANSMITTED DATA (BA)

Signals on this lead are generated by the data communication terminal equipment and are connected to the transmitting signal converter in the data set. This lead is held in the "marking" condition when no signals are to be transmitted.

### 11.4 RECEIVED DATA (BB)

Signals received on this lead are generated by receiving signal converter in the data set.

### 11.5 REQUEST TO SEND (CA)

Signals on this lead are generated by the data communication terminal equipment. When ON, CA turns on the transmitter carrier of the data set arranged for line turnaround or half duplex operation. When OFF, CA holds half duplex data sets in receive mode. This circuit is turned ON when the Line Control option is included, by a received "turnaround" character or a locally generated STX code. (See section 6.1g). The circuit is turned OFF by a recognized EOT (may be strapped to have no effect), by a transmitted "turnaround" character such as ETX. CA may be strapped to be ON or OFF when power is applied and to be ON when the motor is ON.

### 11.6 CLEAR TO SEND (CB)

Signals on this lead are generated by the transmitting data set (if strapped) to indicate that it is prepared to transmit data. This lead, when ON, lights the READY indicator unless the INTERRUPT indicator is on. Optionally, with use of Line Control, it is turned OFF by recognition of a "turnaround" character. A strapping option will permit SCF to control the READY indicator, instead of CB.

### 11.7 DATA SET READY (CC)

Signals on this lead are generated by the data set to indicate that it is connected to a communication line and is in the data mode.

### 11.8 DATA TERMINAL READY (CD)

Signals on this lead are generated by the Printer to indicate that it is capable of receiving a call. This lead is held in the OFF condition when Printer power is off, the Printer is in LOCAL, or when a low paper condition has occurred with CC OFF. EOT may be strapped to cause CD to go OFF. Also, when the Line Control option is included, this lead is turned OFF to initiate forced disconnect by the dataset upon recognition of DLE EOT. Data Terminal Ready is in the ON condition at all other times.

### 11.9 RING INDICATOR (CE)

The ON condition of this circuit indicates that a ringing signal (CE) is being received on the communication line. Approximately 12 seconds after CE turns ON if no Dataset Ready (CC) is generated by the dataset the Printer will turn its motor off. Also used in conjunction with the Automatic Answerback options and Automatic Answer Modems and Datasets.

### 11.10 RECEIVED LINE SIGNAL DETECTOR (CF)

Used in conjunction with the disconnect circuit of the Dataset Control option, to indicate the presence of the carrier signal at the dataset.

### 11.1 SECONDARY REQUEST TO SEND (SCA)

This lead controls the reverse channel transmitter. It is in an ON mode when CA is OFF unless the interrupt button is used to generate a break while Request to Send is OFF. SCA is only used with Bell type 202 Datasets.

### 11.12 SECONDARY RECEIVE LINE SIGNAL DETECTOR (SCF)

This signal is coupled into the terminal while Request to Send is ON. A loss of reverse channel is treated as a detected break. SCF is only used with Bell type 202 Datasets. The Clear to Send signal, CB, controls the READY indicator, a strapping option will permit SCF to perform this function.

## 12.0 ELECTRICAL SPECIFICATIONS

### 12.1 VOLTAGE AND FREQUENCY

Standard - 117± 10% VAC, single phase
or 100/117/200/220/240 ± 10% VAC, single phase
Frequency - 60 ± 1 HZ
50 ± 1 HZ

### 12.2 POWER

| | |
|---|---|
| Motor Off | 25 Watts |
| Motor On - No Printing | 65 Watts |
| Motor On - Printing | 145 Watts |

### 12.3 TOTAL HARMONIC DISTORTION

The unit is designed to operate properly on a line voltage having a total harmonic content no greater than 5% of the fundamental.

### 12.4 INRUSH CURRENT

The startup in rush current does not exceed 15 times the nominal value and does not exceed six times the nominal value after 0.2 seconds.

## 13.0 MECHANICAL SPECIFICATIONS

### 13.1 SIZE

**SR Model**

34.25" H x 22.62" W x 15.38" D

87 cm H x 57.45 cm W x 39.07 cm D

**KSR Model**

34.25" H x 22.62" W x 20.00" D

87 cm H x 57.45 cm W x 50.80 cm D

See figure 4.

### 13.2 WEIGHT

91 lbs. (41 Kg) SR Model with Pedestal

98 lbs. (44 Kg) KSR Model with Pedestal

### 13.3 EXTERIOR FINISH

**Printer**

Keyboard Cover Plate: Charcoal, satin baked vinyl

Keyboard Trim Panel: Charcoal, satin baked vinyl, with Burnt Orange Accent

Keyboard Buttons: Parchment, with Grey Control buttons, molded ABS

Paper Advance Knob: Greige, with Burnt Orange insert, Lexan*

All remaining Printer surfaces: Greige, textured Noryl*

*Trademark General Electric Company

**Pedestal**

Side Frames: Greige, satin baked vinyl

Front and Back Accent Panels: Burnt Orange, satin baked vinyl

Pedestal Feet: Brushed Aluminum

Optional: All Burnt Orange surfaces may be replaced with either Blue or Green.

## 14.0 ENVIRONMENTAL SPECIFICATIONS

The Printer with its various options is suited for used in non-airconditioned factory and office environments with the following characteristics:

### 14.1 TEMPERATURE

+32°F (0°C) to +110°F (44°C) operating.
−20°F (−30.5°C) to +160°F (71.0°C) storage.

### 14.2 RELATIVE HUMIDITY

10 to 95% operating and non-operating. (No Condensation)

### 14.3 ALTITUDE

0 - 12,000 feet (3,650 m) operating.
0 - 50,000 feet (15,240 m) non- operating.

## 15.0 ORDERING INFORMATION

### 15.1 BASIC EQUIPMENT

Unless otherwise specified, the following items are supplied:

a) Printer

b) Two ribbon cartridges

c) Data Set Cable, 5 feet (1.52 m) long.

d) Power Cable, 9 feet (2.74 m) long, 3 conductors with attached grounding type plug. (Domestic)

e) Vinyl dust cover

### 15.2 OPTIONAL ITEMS

Optional circuit modules, desired position of jumpers, and other required options as defined in sections 8.0, 9.0, and 10.0 must be separately specified.

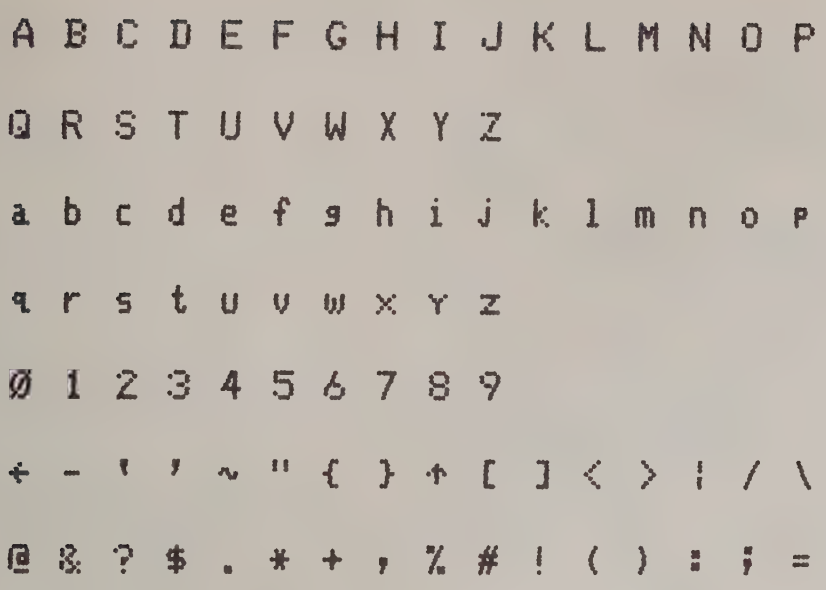


**Figure No. 1—Print Character Set**

## *ASCII code chart*

| Bits $b_7$ $b_6$ $b_5$ → | | | | | 0 0 0 | 0 0 1 | 0 1 0 | 0 1 1 | 1 0 0 | 1 0 1 | 1 1 0 | 1 1 1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $b_4$ | $b_3$ | $b_2$ | $b_1$ | Row ↓ Column → | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| 0 | 0 | 0 | 0 | 0 | NUL | DLE | SP | 0 | @ | P | ` | p |
| 0 | 0 | 0 | 1 | 1 | SOH | DC1 | ! | 1 | A | Q | a | q |
| 0 | 0 | 1 | 0 | 2 | STX | DC2 | " | 2 | B | R | b | r |
| 0 | 0 | 1 | 1 | 3 | ETX | DC3 | # | 3 | C | S | c | s |
| 0 | 1 | 0 | 0 | 4 | EOT | DC4 | $ | 4 | D | T | d | t |
| 0 | 1 | 0 | 1 | 5 | ENQ | NAK | % | 5 | E | U | e | u |
| 0 | 1 | 1 | 0 | 6 | ACK | SYN | & | 6 | F | V | f | v |
| 0 | 1 | 1 | 1 | 7 | BEL | ETB | ' | 7 | G | W | g | w |
| 1 | 0 | 0 | 0 | 8 | BS | CAN | ( | 8 | H | X | h | x |
| 1 | 0 | 0 | 1 | 9 | HT | EM | ) | 9 | I | Y | i | y |
| 1 | 0 | 1 | 0 | 10 | LF | SUB | * | : | J | Z | j | z |
| 1 | 0 | 1 | 1 | 11 | VT | ESC | + | ; | K | [ | k | { |
| 1 | 1 | 0 | 0 | 12 | FF | FS | , | < | L | \ | l | \| |
| 1 | 1 | 0 | 1 | 13 | CR | GS | - | = | M | ] | m | } |
| 1 | 1 | 1 | 0 | 14 | SO | RS | . | > | N | ^ | n | ~ |
| 1 | 1 | 1 | 1 | 15 | SI | US | / | ? | O | _ | o | DEL |

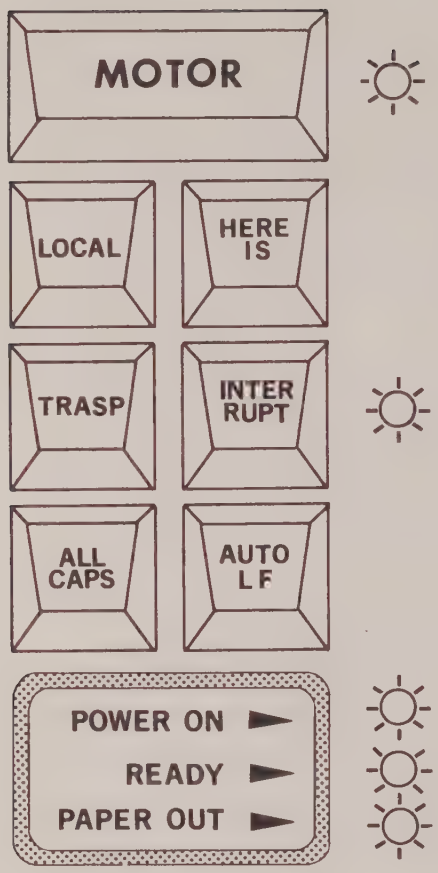


Figure No. 2A—Control Cluster - KSR Model

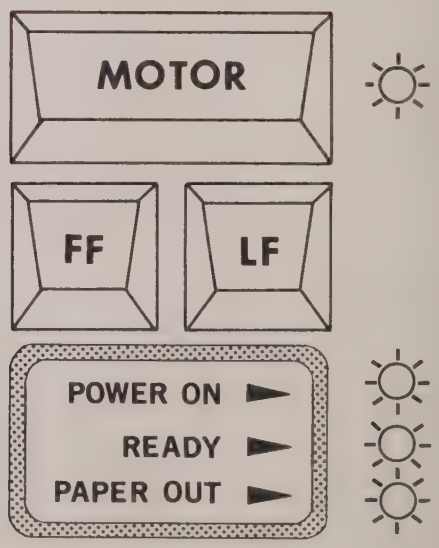


Figure No. 2B—Control Cluster - SR Model

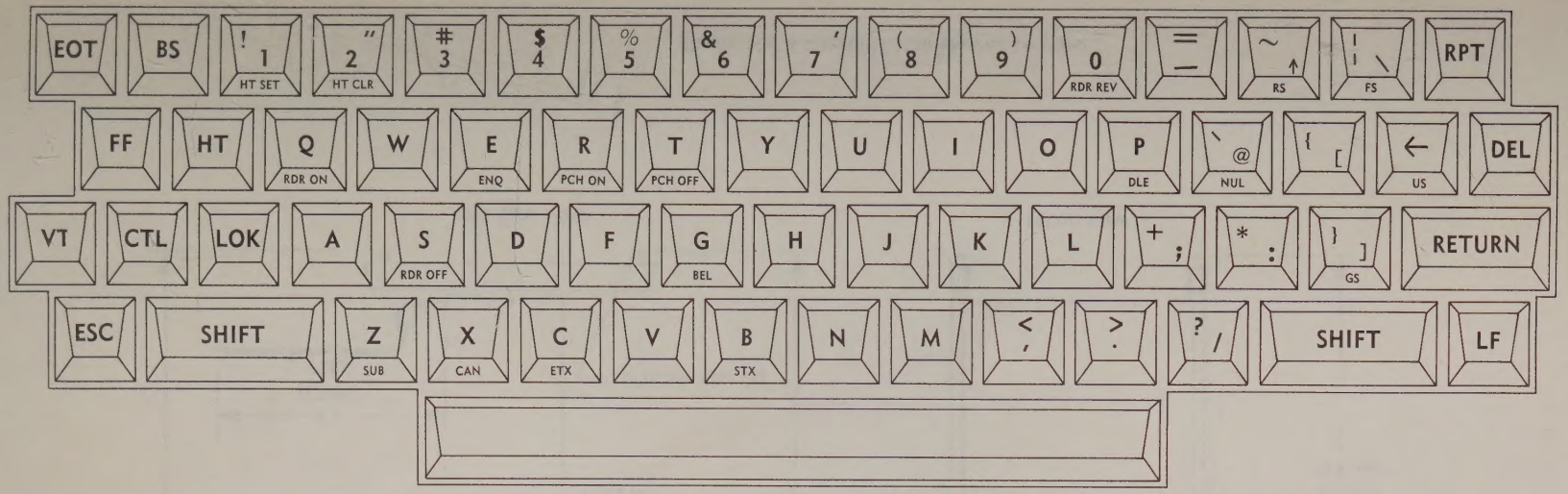


**Figure No. 3A—ANSI Keyboard**



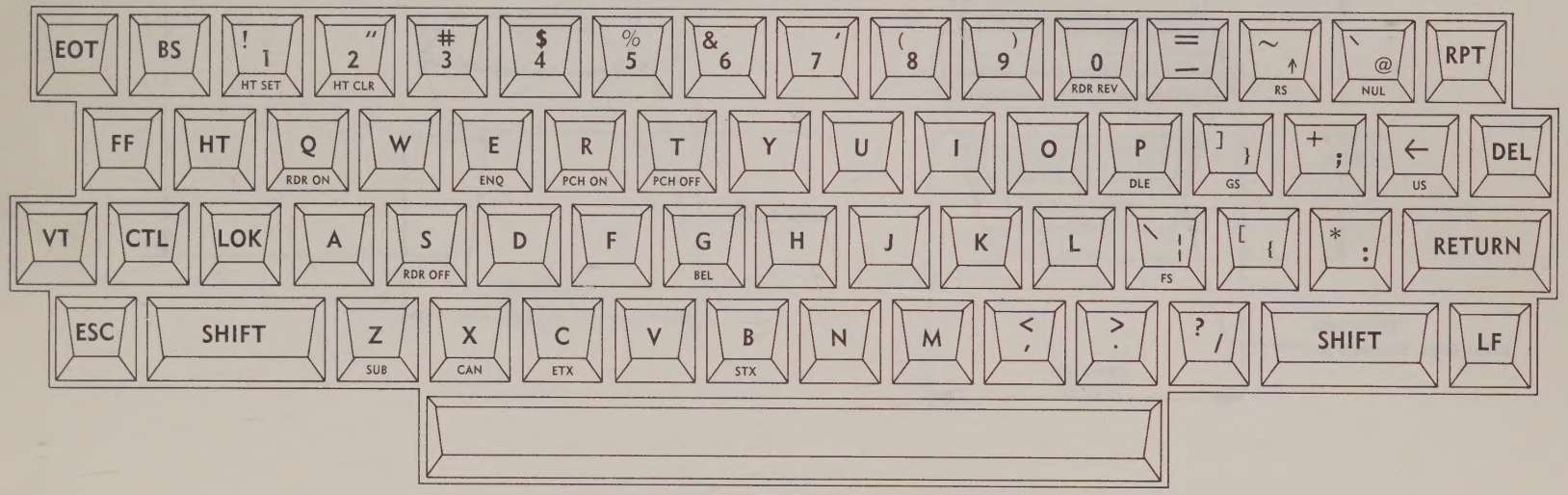


**Figure No. 3B—ECMA Keyboard**

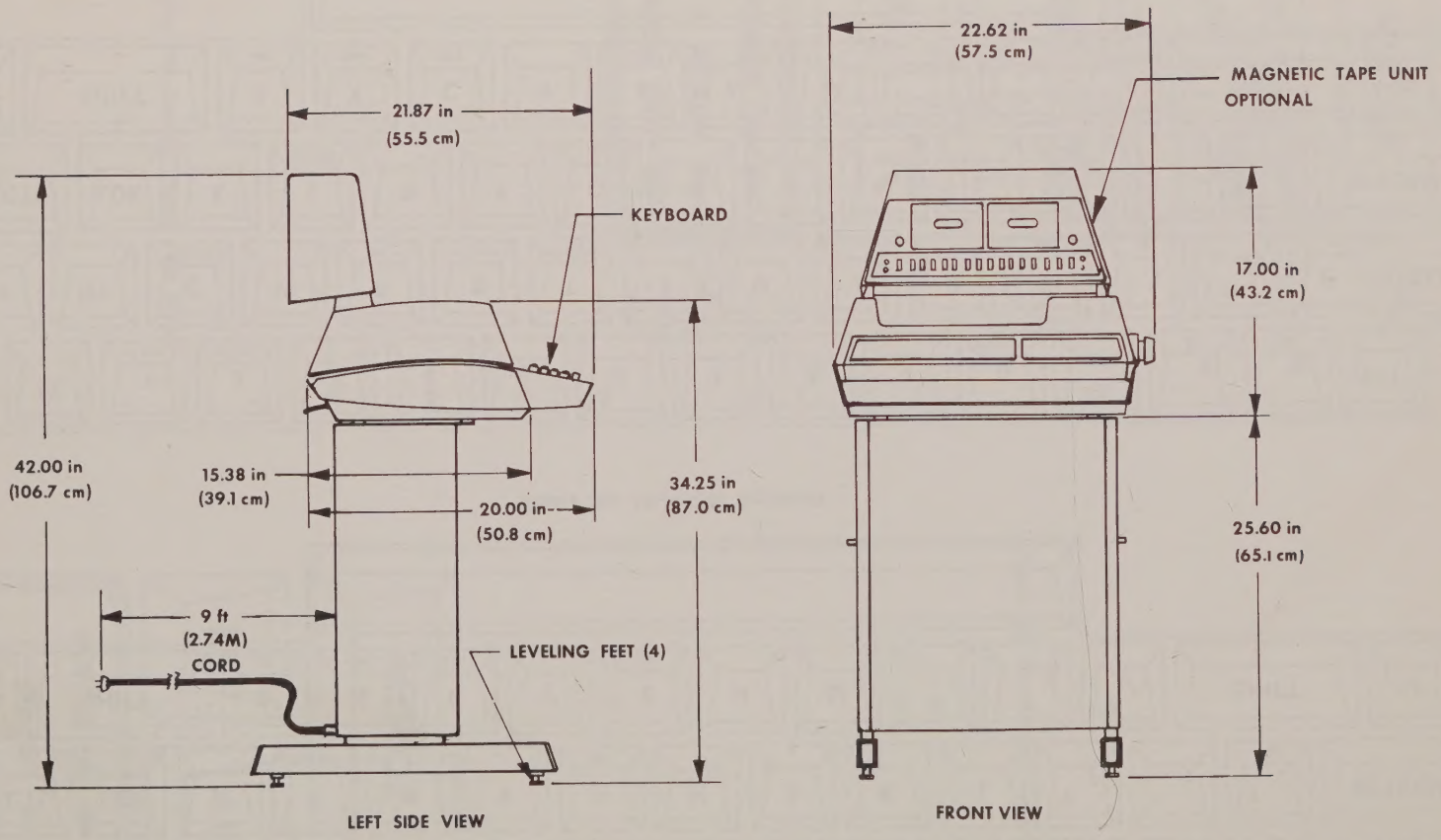


**Figure No. 4—TermiNet 30 Outline Drawing**

GENERAL ELECTRIC

www.manualsplus.com

1018970

General Electric Company
Data Communication Products Department
Waynesboro, Virginia 22980

3/75/5M